

Claims:

- c1 (Previously presented) A method for dense encoding and retrieving of information represented in electronic computers, the method comprising
- (a) choosing an appropriate modulus m , positive integer n , corresponding to the number of bits to be encoding, and generating $n \times n$ matrix A with integer elements where the diagonal elements of A differs modulo m from all the other elements of their column, and where A can be written as matrix product BC where B is an $n \times t$ matrix, C is a $t \times n$ matrix, where t is less than n ;
 - (b) encoding the length- n vector x to the length- t vector xB , by vector-matrix product modulo m ;
 - (c) storing the length- t vector xB in physical computational devices;
 - (d) retrieving the stored vector by computing $xBC=xA$ by vector-matrix product modulo m ;
 - (e) for every coordinate of vector $xBC=xA$, filtering out the terms added as the linear combination of other coordinates of vector x .
- c2 (Previously presented) A method according to claim 1, wherein the modulus m is non-prime- power composite positive integer, the diagonal elements of matrix A are non-zero modulo any prime-divisors of m , and each non-diagonal elements of matrix A are zero modulo for at least one prime divisor of m .
- c3 (Previously presented) A method according to claim 2, wherein the filtering step for retrieving the original values of the encoded 0-1 vector x further comprising:
- (a) periodical change of the values of the coordinates of vector x with original value equal to 1 on values $0, 1, 2, \dots, m-1$, and no change of the values of the coordinates of vector x with original value equal to 0;
 - (b) measuring the periodicity of each coordinates of vector $xBC=xA$;
 - (c) if a coordinate has period equal to m then its original value was 1.
- c4 (Previously presented) A method according to claim 1, wherein vector x to be compacted is a row-vector of a matrix.

- c5 (Previously presented) A method according to claim 1, wherein vector x to be compacted is a column-vector of a matrix.
- c6 (Currently amended) A system for dense encoding and retrieving of information represented in electronic computers or other physical devices, the system comprising
- (a) choosing a modulus m to be a non-prime-power composite positive integer, positive integer n corresponding to the number of bits to be encoded, and generating $n \times n$ matrix A with the diagonal elements being non-zero modulo any prime-divisors of m , and each non-diagonal elements of matrix A are zero modulo for at least one prime divisor of m , and where A can be written as matrix product BC where B is an $n \times t$ matrix, C is a $t \times n$ matrix, where t is less than n ;
 - (b) choosing ~~step-functions~~ functions s_1, s_2, \dots, s_n on the $[a, b]$ real interval, corresponding to time, such that the following properties hold:
 - (b1) function s_i has finitely many, but at least one non-zero steps modulo m , for $i=1, 2, \dots, n$;
 - (b2) the step of function s_i is either 0 modulo m or it is non-zero modulo all individual prime-divisors of number m , for $i=1, 2, \dots, n$;
 - (b3) no two different functions s_i and s_k have non-zero steps in the same point r in the real interval $[a, b]$;
 - (c) encoding bit-sequence h_1, h_2, \dots, h_n , such that bit h_i is encoded by $x_i = h_i s_i$, for $i = 1, 2, \dots, n$; ~~by denoting the n bits to be stored by h_1, h_2, \dots, h_n , bit h_i is encoded first as $x_i = h_i s_i$, for $i = 1, 2, \dots, n$;~~
 - (d) computing quantity ~~with matrix B~~ , $z = xB$, by using matrix B and vector x ; ~~is computed~~;
 - (e) storing step functions z_1, z_2, \dots, z_t ~~are stored~~;
 - (f) computing $x' = zC = xBC$ modulo m ~~is computed~~;
 - (g) ~~by observing the change of the values of the piecewise constant function x'_i , for $i = 1, 2, \dots, n$; and identifying $h_i = 0$ if we conclude that if all the steps of function x'_i are 0 modulo at least one prime divisor of m , then $h_i = 0$, otherwise, identifying~~ identifying $h_i = 1$.

- c7 (Previously presented) A system, according to claim 6, wherein step-functions are stored in physical devices admitting linear combinations, and the values of the steps modulo m can be observed from the spectrum of electromagnetic radiation emitted by the devices.
- c8 (Previously presented) A system according to claim 6, wherein vector $h=h_1, h_2, \dots, h_n$ to be compacted is a row-vector of a matrix.
- c9 (Previously presented) A system according to claim 6, wherein vector $h=h_1, h_2, \dots, h_n$ to be compacted is a column-vector of a matrix.
- c10 (Cancelled)